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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 015161PC	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/FR00/01593	International filing date (*day/month/year*) 08 June 2000 (08.06.00)	Priority date (*day/month/year*) 09 June 1999 (09.06.99)
International Patent Classification (IPC) or national classification and IPC G02B 6/25		
Applicant FRANCE TELECOM		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
27 December 2000 (27.12.00)	20 September 2001 (20.09.2001)
Name and mailing address of the IPEA/EP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
– PCT/FR00/01593

I. Basis of the report

1. With regard to the elements of the international application:*

☐ the international application as originally filed

☒ the description:

pages 1-11, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☒ the claims:

pages _____, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages 1-4, filed with the letter of 09 July 2001 (09.07.2001)

☒ the drawings:

pages 1/2,2/2, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

I. Basis of the report

1. This report has been drawn on the basis of *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

Box I, point 5

1. The deletion, in the present independent claim 1, of the original detail according to which the optical fibres of the fibre assembly are parallel causes the claim to be extended unacceptably beyond the content of the application as filed (PCT Rule 70.2(c)), since no other option is directly or indirectly mentioned in the original application [replacing said detail with the other specific detail according to which the fibres are "aligned" is also unacceptable because it is perfectly clear that the fibres to be shaped do not extend along the same line (only the end surfaces of the fibres are aligned, as reiterated below)].
Therefore, the present report has been established as if said deletion had not been made in claim 1.

2. The question of whether or not the deletion, in the present independent claim 1, of the original specific detail according to which "the plane or planes in which the fibres lie is (are) thus parallel to the line (X) of hottest points of the electric arc and the edge or edges of said plane(s) on which the fibre ends are located is (are) spaced apart therefrom" complies with PCT Rule 70.2(c) cannot be answered directly, because of the completely obscure and/or contradictory nature of this other original specific detail (cf. the objections already raised in the written opinion of 9 April 2001), without a more thorough analysis of

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the original disclosure.

It follows that the original overall content of the application discloses, in particular, the following essential features:
(a) the fact that the fibre ends (or rather the end surfaces of the fibres) are located in a plane that is spaced apart from the line of hottest points of the electric arc (cf. page 4, lines 26-29),
(b) the fact that "the ends (or rather the end surfaces) of the fibres of the tape are aligned at a distance d of around one millimetre from said hot point (or rather from said line of hottest points)" (cf. page 6, lines 2-5), and
(c) the fact that the end surfaces of the fibres are all located at the same distance from said line of hottest points (cf. figure 3), meaning that the line [cf. point (b) above] along which said end surfaces are coplanarly arranged [cf. point (a) above] must be parallel to said line of hottest points (and below said line).

In order to comply with PCT Rule 70.2(c), the original obscure detail discussed at the start of the present point 2, rather than being purely and simply deleted, should have been amended so as to specify at least that "the end surfaces of the fibres are coplanarly arranged along a line parallel to and spaced apart (on the near side) from the line of hottest points of the electric arc" [the phrase "the end surface of the fibre end

I. Basis of the report

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is located ... at a distance d from said line", as currently added to the end of the claim, does not necessarily mean, in particular, that the end surfaces of the fibres are all located at a constant distance from said line; instead, it merely means that each of the end surfaces is spaced apart from said line by a distance that can vary from one end surface to the next; and moreover, the present wording gives absolutely no indication of any need for the end surfaces to be located in a single plane along a predetermined line of said plane (said line furthermore being parallel to said line of hottest points), whereas the original wording, however obscure and/or contradictory, at least had the merit of suggesting said alignment of said end surfaces since it mentioned that said surfaces were located on the edge of a plane].

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-4	YES
	Claims		NO
Inventive step (IS)	Claims	1-4	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-4	YES
	Claims		NO

2. Citations and explanations

A new claim 1 amended in accordance with Box I, point 5 and Box VIII would probably have been considered to comply with the requirements of novelty and inventive step of PCT Article 33(2) and (3), since none of the cited documents discloses or suggests the idea of arranging all of the end surfaces of the fibres in a spaced apart position and at a constant distance from the line of hottest points of the electric arc, along a line parallel to said line of hottest points, so as to achieve *simultaneous* ***uniform*** rounding of all of the fibre ends.

Therefore, of the cited documents, only US 5 595 669 A (D1) discloses (cf., in particular, figure 3 and the related description) a method for collectively producing microlenses at the end of a bundle of parallel optical fibres by carrying out a step of heating the ends of all of the fibres by means of an electric arc, with the end fibre surfaces arranged along a predetermined line. However, in the method according to D1, said line along which said end fibre surfaces are arranged is *not parallel* but *perpendicular* to said line of hottest points such that the fibres have to be *moved through* the electric arc *rather than held stationary* in order to produce the microlenses, as a result of which the microlenses are

produced *one after the other* rather than *simultaneously* as in the present application [each of the end surfaces of the fibres according to D1 must also presumably cross the line of hottest points rather than remaining on the near side or the far side of said line, since no specific indication to this effect is given in D1].

Figure 3 of D3 (US 4 804 395 A) as well as figure 6 of D4 (Journal of Lightwave Technology, vol. 13, no. 8, 1995, pages 1736-1744) also each disclose a method for making a microlens wherein the end surface of the fibre to be heated is positioned not on the near side but on the far side of the line of hottest points (meaning that the end portion of the fibre crosses said line of hottest points in D3 and D4, whereas no longitudinal portion of the fibre crosses said line in the present application). Moreover, the methods according to D3 and D4 are useful for shaping only one fibre instead of a plurality of fibres.

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

1. The present independent claim 1 has not been properly delimited with respect to the closest prior art (PCT Rule 6.3(b)) represented by D1, which already discloses a method for collectively producing microlenses at the end of a bundle of parallel optical fibres by carrying out a step of heating the ends of all of the fibres by means of an electric arc, with the end fibre surfaces arranged along a predetermined line (see Box V above).

2. Furthermore, the introductory part of the description has not been made consistent (PCT Rule 5.1(a)(ii) and (iii)) with the wording of the present independent claim, and omits to cite document D1, with a brief discussion of the relevant content thereof (see the discussion of this question in Box V above).

3. There is no antecedent for reference number [3] used on page 4, line 2. Meanwhile, the document cited on page 3, lines 20-24 has no reference number.

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

In the present claim 1, the subexpression "of the end surface" used in the expression "step of heating the end surface of the end of all of the fibres" should have been deleted because it is clear that the electric arc affects the entire end portion or end of the fibres, and not just the end surface thereof (PCT Article 6).